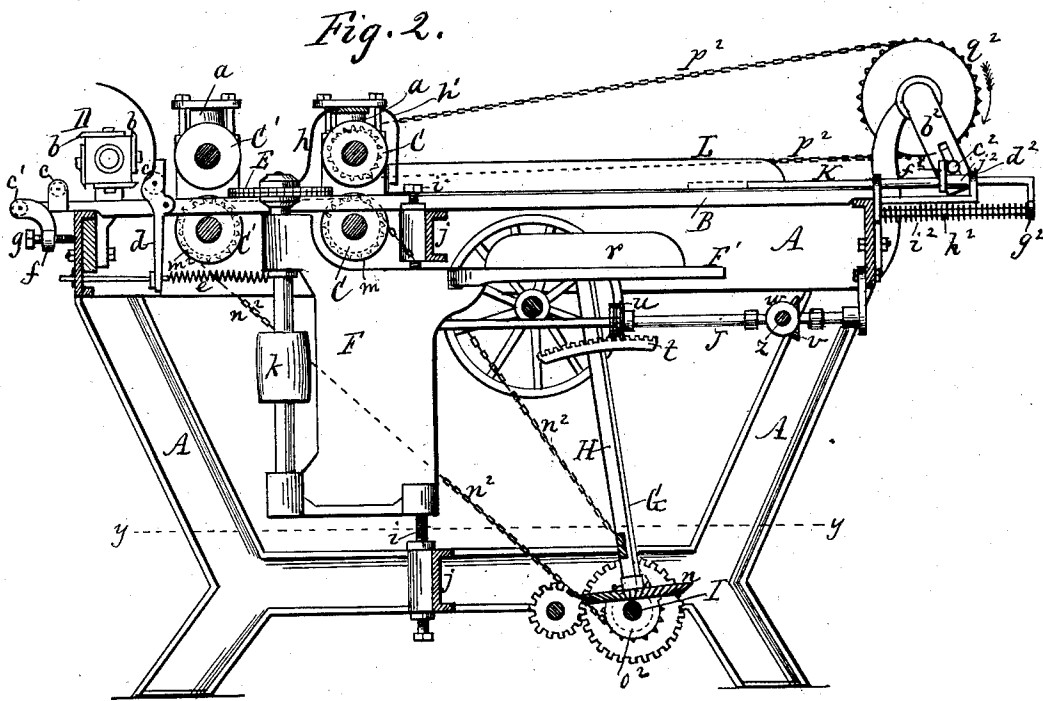
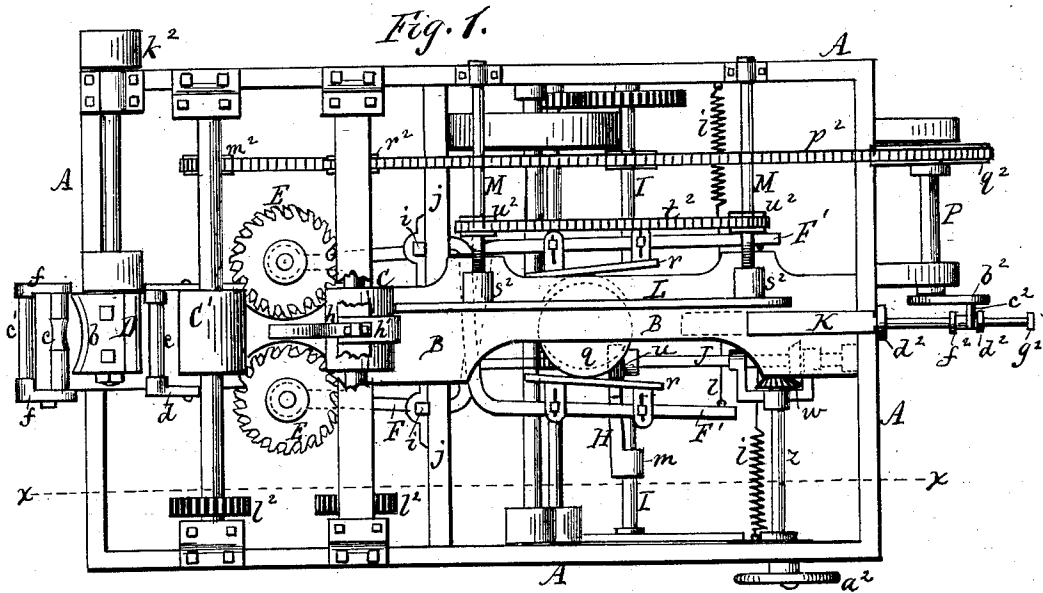


C. R. PENFIELD.

MACHINE FOR JOINTING AND PLANING STAVES.

No. 374,317.

Patented Dec. 6, 1887.



Attest.  
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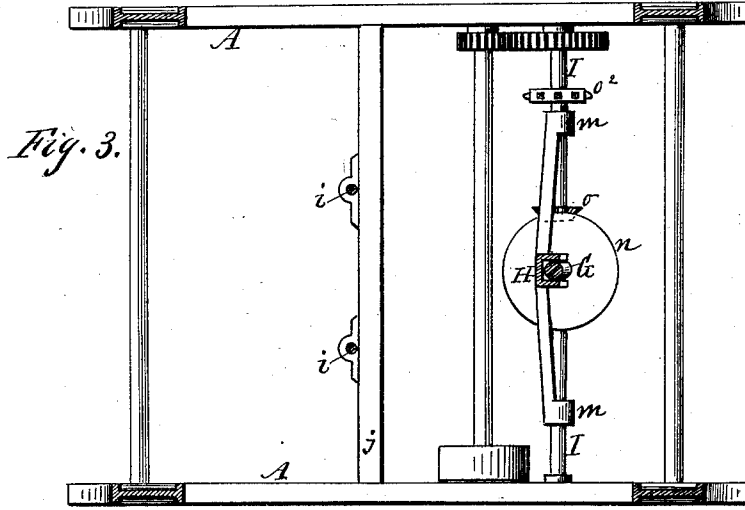


Fig. 3.

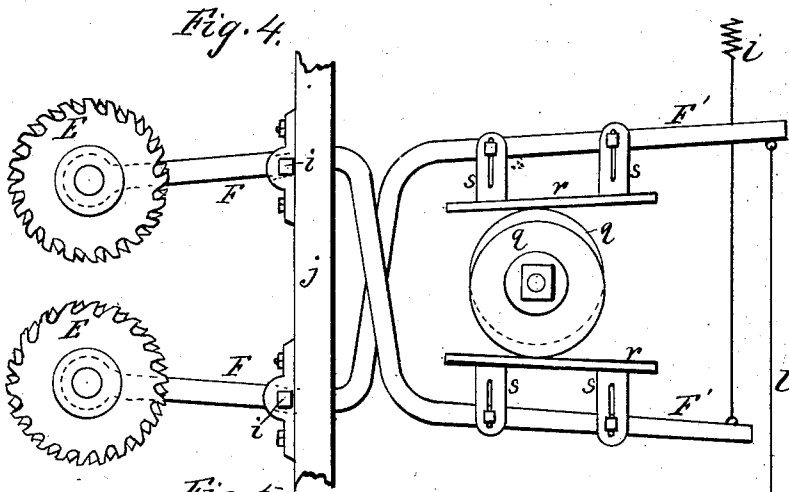


Fig. 4.



Fig. 5.

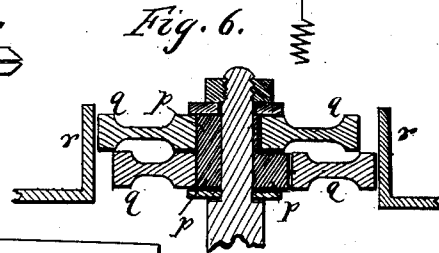


Fig. 6.

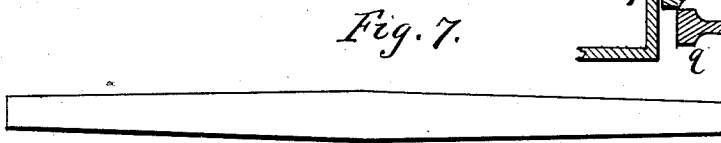
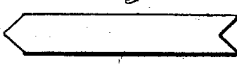


Fig. 7.

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Fig. 8.  Inventor.  
*Chas R. Penfield,*  
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*Atty.*

# UNITED STATES PATENT OFFICE.

CHARLES R. PENFIELD, OF ROCHESTER, NEW YORK.

## MACHINE FOR JOINTING AND PLANING STAVES.

SPECIFICATION forming part of Letters Patent No. 374,317, dated December 6, 1887.

Application filed March 15, 1887. Serial No. 231,052. (No model.)

### To all whom it may concern:

Be it known that I, CHARLES R. PENFIELD, of Rochester, in the county of Monroe and State of New York, have invented a certain  
5 new and useful Improvement in Machines for Jointing and Planing Staves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being  
10 had to the drawings accompanying this application.

My improvement relates to machines for jointing and planing staves.

The primary feature of the invention is an arrangement by which staves of different widths  
15 can be jointed of proper bilge form, so that they will accurately fit when set up in a barrel, as will be more fully described.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a longitudinal vertical  
20 section in line *x x* of Fig. 1. Fig. 3 is a horizontal section in line *y y* of Fig. 2. Fig. 4 is a diagram showing an enlarged plan view of the saws for jointing the edges of the staves, the gates to which the saws are attached, and  
25 the cams for operating the gates. Fig. 5 is a diagram showing an elevation of the two sets of saws and a stave between them, on which they are acting. Fig. 6 is an enlarged vertical section of the cams for operating the swinging gates. Fig. 7 is a plan view of one of the staves. Fig. 8 is an enlarged end view of one  
30 of the staves.

A indicates the frame of the machine, which may be of any suitable form and construction.

35 B is the bed-plate or table, on which the staves are laid in a pile, one on top of another, preparatory to being run through the machine. The staves are first sawed or cut from a bolt or block of wood, and are of uniform thickness, but of varying widths, according to  
40 the thickness of the bolt from which they are cut.

C C and C' C' are two sets of feed-rollers, two being above and two below the top of the bed-plate B, with sufficient space between them for  
45 the staves to pass. The upper rollers have rubber or other springs, *a a*, resting over the boxes in which their journals run, for producing proper elasticity.

D is the cutter-head, provided with a set of  
50 knives, *b b*, that have concave edges, said cutter planing the top surface of the staves as

they pass through and the concave knives producing the requisite curve on said planed surface corresponding with the circle of the barrel.

*c c* are pressure-rollers resting over the bed  
55 on opposite sides of the cutter, and *c'* a roller on the under side, said rollers serving to hold the stave steadily to its place while the cutter is acting thereon. The upper roller in front  
60 or outside of the cutter is concaved, as shown in Fig. 1, to fit the curved top of the stave already planed and guide it straight in passing out. The inner roller, *c*, is attached to a rock-  
65 arm, *d*, with which is connected a spring, *e*, to produce the requisite pressure of the roller on the stave, and the outer roller, *c'*, is attached to a pivoted arm, *f*, through which  
70 passes a set-screw, *g*, to adjust it properly to position.

*h* is a spring attached to a bar resting over the upper roller, C, said spring extending  
75 down near to the bed-plate and bearing on top of the stave as it passes through.

*h'* is a guard on the opposite side, also extending  
80 down near to the bed-plate, as shown in Figs. 1 and 2.

E E are two sets of saws, forming jointers, and F F are two swinging gates to which the  
85 saws are attached. The gates consist of arms on levers, which are pivoted at *i i* to cross-ties *j j* of the frame, so as to turn easily. The pivots consist of screws, by which means the gates can be adjusted up and down to keep the  
90 saws accurately in line with the edges of the staves as they pass through. Each set of saws consists of two or more saws, one placed above the other and fitted face to face, as shown in  
95 Fig. 5, and the teeth of each set of saws preferably alternate—that is, the teeth of one saw rest in line with the spaces between those of the next, as shown in Fig. 4. The teeth are  
100 of any suitable shape at the point, according to the desired shape to be produced on the edge of the stave. By alternating the teeth of the saws, as described, proper clearance is obtained, and the wood will not be slivered or broken. The saws are driven by bands which pass round pulleys *k k*, Fig. 2, of their shafts. The long arms F' F' of the gates back of the  
105 pivots are crossed, as shown in Fig. 4, and with the outer ends are connected springs *l l*,

extending in opposite directions and attached to the main frame, the tendency of which is to draw the arms toward each other, and thus separate the two sets of saws.

5 G is an upright shaft attached to a swinging frame, H, which has its bearings at the bottom on a cross-shaft, I, as shown at *m m*, Fig. 3. On the lower end of shaft G is a bevel-wheel, *n*, with which engages a bevel-pinion, *o*, of shaft I, by which means shaft G receives motion. On the upper end of shaft G are two eccentrics, *p p*, on which rest two circular wheels, *q q*, Figs. 4 and 6, that form cams and which rest between cheek-pieces *r r*, attached to long arms F' F' of the gate, said cheek-pieces being provided with slotted lugs *s s*, through which pass set-screws, attaching them to the arms F' F'. These cheeks are set at an incline, with the narrow ends toward the saws, and the incline can be changed at any time by loosening the set-screws and tightening them up again. The cams *q q* overlap each other, as shown in Fig. 6, and rest against the cheeks, and as they revolve they impart a vibrating motion out and in to the arms F' F' and consequently to the saws E E.

*t*, Fig. 2, is a segment-rack attached to the side of the frame H that carries the cam-shaft G, and *u* is a worm engaging therewith, said worm being attached to a shaft, J, that extends longitudinally of the machine, and has thereon a bevel-gear, *v*, with which engages another bevel-gear, *w*, on a shaft, *z*, driven by a hand-wheel, *a*, on the outside of the machine. By turning said hand-wheel it will be seen that worm *u* will be turned, and as it has no end movement it will move the segment-rack *t* forward or back, and will consequently adjust the cams *q q* forward or back between the cheeks *r r*. This will impart greater or less throw of the saws E E toward each other, by reason of the cams being moved nearer to or farther from the pivots *i i* of the gates, the object of which will be presently described.

45 P, Figs. 1 and 2, is a crank-shaft mounted in bearings at the rear end of the machine and provided with a crank-arm, *b*, having a crank-pin, *c*, which is adjustable to different positions in a slot of the crank-arm.

50 K is a thin blade forming a plunger, resting flatwise on the rear end of the bed-plate B and behind the pile of staves laid on the bed-plate to be fed forward into the machine. The stem of this plunger rests in suitable stationary bearings, *d*, of the frame, and the stem of the plunger is provided with an upright lug, *f*, against which the crank-pin *c* strikes as the crank turns and forces the plunger forward. The stem of the plunger also has an eye or socket, *g*, on the under side that slides on a stationary rod, *h*, on which is located a spiral spring, *i*. After the crank-pin has forced the plunger forward and is released from the same, the spiral spring will throw the plunger back again ready for a new action.

65 *j* is a rubber or other spring on the stem of the plunger, which spring strikes stop *d* to

prevent shock. The plunger K is only thick enough to push the bottom stave from under the pile into the machine.

70 The operating parts of the machine may be driven by any suitable means. In the drawings the cutter D is driven by a pulley, *k*, on its shaft, on which runs a band. (Not shown.) Each pair of the feed-rollers C C are connected by spur-gears *l* *l*. The shafts of the two lower feed-rollers C C have sprocket-wheels *m* *m*, over which runs a drive-chain, *n*, which also passes around a sprocket-wheel, *o*, on cross-shaft I at the bottom of the machine. The crank-shaft P is drawn by a drive-chain, *p*, which passes around a sprocket-wheel, *q*, on the crank-shaft and a sprocket-wheel, *r*, on the shaft of the upper feed-roller, C. The parts are so timed as to give the proper movements to the mechanism.

85 L, Figs. 1 and 2, is a plate forming a rest, set up edgewise on the bed-plate B and serving to keep the staves in position as they are fed forward. This rest is adjusted in and out laterally, to accommodate staves of different widths, by means of two screw-shafts, M M, Fig. 1, which screw into lugs *s* *s* of the rest and are fixed against end movement. The two screw-shafts are turned simultaneously by a drive-chain, *t*, Fig. 1, that passes around sprockets *u* *u* on the shafts. The chain is operated by hand.

90 The operation is as follows: A pile of the staves is placed on the bed-plate B and in front of the plunger K. At the proper time the plunger is forced forward by the crank-pin *c*, as before described, and striking the end of the bottom stave it pushes it from under the pile into the machine. As soon as the stave enters, the feed-rollers C feed it forward under the spring *h*, and the saws commence their action. Commencing on the narrow end the saws gradually expand or separate as the stave passes through, this action being produced by the cams *q q*, acting against the cheeks *r r*, as before described. As soon as the center of the stave is reached, the saws commence to approach each other again and gradually close toward the rear end. By this means a perfect bilge or swell is produced on the edge of the stave. When the cams are set to a certain adjustment, the machine is adapted to jointing a series of staves of a given width and will produce the same exact bilge on all of them. When wider or narrower staves are to be run through, the cams have to be adjusted forward or back between the cheeks *r r*, which correspondingly changes the gage of the saws, and also produces more or less throw of them, so that the bilge will also be correspondingly changed. By adjusting the cams forward toward the end where the cheeks are nearest together the machine is adapted to wider staves and will cut a greater bilge, for the reason that the saws have more throw. By adjusting the cams back in the opposite direction the machine will joint narrower staves with less bilge. The bilge is ad-

justed exactly to the width of the staves, so as to make a perfect barrel when the staves are set up.

The edges of the staves may be jointed of any desired shape. The drawings show a V-shaped tongue on one edge and a corresponding V-shaped groove on the other edge; but the staves can be jointed with an ordinary tongue and groove or with tongues and grooves of any desired form, or in half-circular form, or with square edges. In making different forms, any desired number of saws may be used in each set, from one upward, and the teeth are modified to cut the desired shape on the edge of the stave.

Having described my invention, I do not claim, broadly, jointing staves of bilge form by saws or cutters that move in and out; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for jointing staves, the combination, with the bed-plate and feed-rollers, of gates with crossed arms pivoted on opposite sides, so as to swing in a horizontal plane, saws attached to said gates and lying in line with the edges of the staves, and cams resting between the arms for operating the gates and causing the saws to joint the staves in bilge form, as described.

2. In a machine for jointing staves, the combination, with the bed-plate and feed-rollers, of gates with crossed arms pivoted on opposite sides, so as to swing in a horizontal plane, saws attached to said gates and lying in line with the edges of the staves, double cams resting between the arms for operating the gates, and an upright shaft on which the cams rest, said shaft being movable forward and back to change the throw of the gates, as herein shown and described.

3. In a machine for jointing staves, the combination, with the bed-plate and suitable feed-rollers, of gates with crossed arms pivoted on opposite sides, so as to swing in a horizontal plane, saws attached to said gates and lying in line with the edges of the staves, double

cams on an upright shaft between the long arms of the gates, and cheek-pieces with slotted lugs attached to the long arms of the gates, against which the cams act, in the manner and for the purpose specified.

4. In a machine for jointing staves, the combination, with the bed-plate and suitable feed-rollers, of gates pivoted on opposite sides, so as to swing in a horizontal plane, saws attached to the gates and lying in line with the edges of the staves, double cams lying between the long arms of the gates and operating the same, said long arms being crossed in front of the cams and behind the pivots, and springs connecting the rear ends of the gates with the opposite sides of the frame, as shown and described, and for the purpose specified.

5. In a machine for jointing staves, the combination, with the bed-plate and suitable feed-rollers, of gates pivoted on opposite sides, so as to swing in a horizontal plane, saws attached to the gates and lying in line with the edges of the staves, the upright shaft carrying cams for operating the gates, the swinging frame to which the upright shaft is attached, and a rack on the frame with which engages a worm to swing said frame forward and back, as set forth.

6. In a machine for jointing staves, the combination, with the bed-plate upon which the staves are placed and a guide against which the edges of the staves rest, of a plunger on the bed-plate which receives forward and back motion, a stud or lug standing upright on the plunger, a crank-wheel above the plunger, a crank-pin on the crank-wheel that strikes the stud on the plunger to give the forward movement, and a spring on the shank of the plunger to retract the same, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHAS. R. PENFIELD.

Witnesses:

R. F. OSGOOD,  
P. A. COSTICH.